

Consistent with this intent, CTN's proposals have sought to make commercial downstream operations adjacent in spectrum to upstream operations. Although CTN has used the term "guardband" to describe the area of spectrum that separates ITFS downstream operations from commercial upstream operations, CTN has never intended that this guardband be vacant. The guardband merely guards ITFS licensees. Wireless cable operators that are willing to assume the interference risk from their own upstream transmissions are welcome to use the guardband spectrum for commercial downstream operations if they can engineer a system that works.

2. CTN's Proposal for the Talkback Channels Is Consistent With Its Frequency Separation Plans.

Petitioners perceive a contradiction between CTN's proposal for a guardband to protect downstream ITFS operations and its proposal to continue to license the 125 kHz ITFS response channels for upstream transmissions.²⁵ However, Petitioners' proposed response station transmitters and the existing ITFS 125 kHz talkback transmitters are completely different transmission systems, and cannot be compared as Petitioners have attempted to do.

²⁵ See Petitioners Comments, at 71 n.112 ("how can CTN square the purported need for a 24 MHz guardband between upstream and downstream transmissions with its proposal to permit upstream and downstream use of nearby channels").

First, ITFS talkback transmitter power is generally limited to 250 milliwatts.²⁶ In contrast, Petitioners call for unlicensed response station transmitters to operate at up to 2 watts.²⁷ See Petitioners Comments, at 55-57. Even if limited as the Commission has proposed in the NPRM, ¶ 42 (maximum EIRP of 18 dBW or 48 dBm), response station transmitters would operate at more than twice the EIRP than the typical EIRP of ITFS talkback transmitters. See Joint Engineering Exhibit, ¶ 6b.

Second, ITFS talkback transmitters are always oriented by the licensee, and so would not be aimed toward an ITFS receiving antenna. In contrast, response station transmitters proposed for two-way services may be aimed at ITFS receiving antennas, either through misorientation or by deliberate design (because an ITFS receive site is in the line of sight between an MDS subscriber and a response station hub).

Third, ITFS talkback transmitters are installed only at registered ITFS receive sites, must be applied for at these known locations, and are limited in number by the number of receive sites.²⁸ See Joint Engineering Exhibit, ¶¶ 6a, c. Should interference problems occur between one ITFS licensee's talkback

²⁶ See 47 C.F.R. § 74.939(e). Operation at higher power is permissible only upon a "special showing of need."

²⁷ Petitioners fail to demonstrate the need for response stations transmitters operating at 2,000 watts. Indeed, Petitioners' own calculations suggest that 200-watt EIRP response stations could successfully communicate with response hubs so long as the hub used a 20 dBi gain receiving antenna. See Joint Engineering Exhibit, ¶¶ 10-11.

²⁸ See 47 C.F.R. § 74.939(b); FCC Form 330, Part VI.

transmitters and another ITFS licensee's receive sites, the affected licensees will know where to look. In contrast, Petitioners envision hundreds of response station transmitters distributed throughout a service area, whose locations are unregistered, and indeed unknown if itinerant response station transmitters are permitted. Interference will be extremely difficult to track down and remedy.

D. The Commission Should Adopt a Frequency Separation Plan Which Gives All Licensees Access to Upstream Frequencies.

After reviewing the comments on its previously proposed frequency separation plans, CTN has developed another plan which preserves the basic principles of CTN's proposals while addressing many of the issues raised by some commenters. Under CTN's revised plan, the Commission would designate eight 6 MHz channels for upstream use: A4, B4, C1, D1 (collectively RC Band 1), E4, F4, G1, and H1 (collectively, RC Band 2). The following figure illustrates the RC bands.

A1 B1 A2 B2 A3 B3 **A4 B4 C1 D1** C2 D2 C3 D3 C4 D4
E1 F1 E2 F2 E3 F3 **E4 F4 G1 H1** G2 H2 G3 H3 G4 TB

Within the 2.5 GHz band, RC Band 1 and RC Band 2 may be used for response transmissions to communicate with response station hubs, and these frequencies may be used for channel bandwidths less than and greater than 6

MHz.²⁹ To protect against the potential of adjacent channel interference, the operator of the two-way transmission system would be required to ensure that there is a 6 MHz separation between upstream transmissions and any ITFS downstream transmission. Thus, for example, B3 and C2 could be used for commercial downstream transmissions. In addition, all licensees of response station hubs would need to comply with the procedures to protect against brute force overload outlined in CTN's Comments.

There are numerous benefits to this plan. Each ITFS licensee of a 4-channel group would hold a license for a response channel, yet no refarming would be necessary.³⁰ This plan provides 48 MHz of spectrum for upstream transmissions within the 2.5 GHz band (plus MDS-1/2/2A would also be available for a total of 58/60 MHz). A wireless cable operator could use almost any multiple of 6 MHz for upstream transmissions.³¹ This plan does not preclude channel

²⁹ In order to ensure the availability of these bands for response transmissions, point-to-multipoint operations on the 6 MHz channels within RC Bands 1 and 2 should be grandfathered for protection from harmful interference at the existing 45 dB and 0 dB ratios as of the effective date of the adoption of rules in this docket. The facilities of point-to-multipoint operations on the channels within RC Bands 1 and 2 would then not generally be permitted to be modified unless the licensee can demonstrate protection from harmful interference for existing and proposed response station hubs at the levels adopted in this proceeding.

³⁰ Some ITFS licensees may hold only one or two channels, and in those instances, channel exchanges may be desirable.

³¹ Petitioners have not indicated how much spectrum should be designated for upstream use. Therefore, they should not be heard to complain that 48 MHz in the 2.5 GHz band is too little.

loading, while ensuring that all ITFS licensees can use their own channels for programming.

From the regulatory standpoint, the principal advantages of this plan are that it eliminates predictive adjacent-channel protection requirements for ITFS, and has substantially less preclusive effect on the growth of ITFS because there would be very limited downstream operations on adjacent channels to response station hubs. In short, the plan provides much-needed certainty to ITFS licensees that they will have access to both upstream and downstream channels. Use of a single band plan may also alleviate problems associated with market-to-market coordination. Accordingly, CTN recommends the Commission designate these frequencies for upstream transmissions.

Even if the Commission does not adopt CTN's revised upstream frequency plan, it must at a minimum require operators to maintain a 6 MHz frequency separation between ITFS downstream transmissions and any upstream transmission. No other methodology has been presented in this proceeding that will ensure interference protection for ITFS downstream transmissions.

III. ITFS OPERATORS MUST HAVE ACCESS TO 25% OF ALL ITFS LICENSED BANDWIDTH.

Almost all commenters agree that ITFS licensees should use or reserve for future use 25% of all licensed bandwidth on ITFS stations operating with digital equipment.³² As indicated in its initial Comments, CTN concurs with this proposal. This proportionate increase in instructional use for stations operating in a digital mode is necessary to effectuate the Commission's long-standing policy of ensuring "substantial use" of the ITFS spectrum for instructional purposes.³³ CTN also supports the position advanced by other educators that data transmissions which are used for instructional purposes should count towards satisfying these ITFS programming requirements.³⁴

In addition, CTN notes that its proposal to designate specific frequencies for upstream and downstream transmissions, although intended primarily to reduce the potential for adjacent-channel interference, will also assist in maintaining the primary, instructional character of ITFS by preserving the entire ITFS spectrum reservation for ITFS services, and not displacing any ITFS licensee from the frequencies assigned for its licensed operations. CTN's spectrum proposal is,

³² See, e.g., Petitioners Comments, at 136-43; Comments of National ITFS Ass'n, Attach., at 2; Maryland Comments, at 5; Schwartz, Woods & Miller Comments, at 4; ITFS Parties Comments, at 14-15; ITF Comments, at 11-12.

³³ Instructional Television Fixed Service, 101 FCC 2d 49, 85-88 (1985).

³⁴ See Comments of the San Francisco-San Jose Education/Operation Consortium, at 8-12.

therefore, consistent with the recommendations of the parties in this proceeding regarding ITFS programming requirements.

V. WIRELESS CABLE OPERATORS MUST MAKE EQUIPMENT AVAILABLE TO ITFS OPERATORS AT THE END OF A LEASE.

As the Commission is well aware, the wireless cable industry has struggled to achieve a viable commercial presence despite the Commission's best efforts to promote the industry as a competitive alternative to cable television. The bleak statistics provided by Petitioners themselves on the industry's current financial difficulties³⁵ substantiate the concerns raised by CTN and others regarding the ability of ITFS operators to continue distributing instructional programming in the event the wireless cable operator becomes insolvent.³⁶

Some parties argue that each ITFS licensee can protect itself from these concerns in their negotiations for excess capacity lease agreements, and thus counsel against further Commission regulation.³⁷ However, there can be no dispute that it is the Commission's responsibility, rather than the responsibility of individual ITFS licensees or wireless cable operators, to preserve the essential educational character of ITFS and to promote its use consistent with the public interest. The policies proposed by CTN are consistent with this responsibility.

³⁵ Petitioners Comments, at 7 n.15.

³⁶ See, e.g., CTN Comments, at 27-30; ITF Comments, at 25-29; Schwartz, Woods & Miller Comments, at 8.

³⁷ Petitioners Comments, at 13; WONC Comments, at 11.

Accordingly, CTN recommends that the Commission adopt safeguards to protect the independence of ITFS licensees despite the significant modifications in transmission systems to be authorized in this proceeding. CTN has proposed two pre-construction methods to accomplish that goal.³⁸ First, the Commission should ensure that an ITFS licensee has access to all equipment necessary to continued distribution of its signal by incorporating into its equipment purchase policy references to dedicated and common equipment. Second, the Commission should require wireless cable operators implementing a digital system to establish a performance bond or escrow account with sufficient funds to ensure uninterrupted operation of participating ITFS stations. CTN urges the Commission to adopt these basic safeguards.³⁹

**VI. APPLICATION PROCESSING RULES FOR TWO-WAY SERVICES
SHOULD NOT OVERBURDEN LICENSEES OR COMMISSION STAFF.**

The vast majority of the commenters, including CTN, support streamlining application processing rules for ITFS and MDS to accelerate the grant of applications and to facilitate the introduction of innovative technologies into the

³⁸ CTN Comments, at 27-30.

³⁹ CTN reiterates its recommendation that the Commission require existing excess capacity lease agreements to incorporate whatever rules or policies are adopted in this proceeding relating to the obligation of a wireless cable operator to make equipment available to ITFS operators at the end of a lease. See CTN Comments, at 29-30.

marketplace.⁴⁰ However, CTN shares the concern of other parties that the application processing system proposed in the NPRM will unnecessarily overburden licensees and the Commission Staff and so not accomplish this goal.⁴¹ Accordingly, CTN has recommended adoption of rules which would not only expedite introduction of two-way services on ITFS and MDS frequencies, but also would make the process simple and transparent for applicants.

A. The Commission Should Open Periodic and Regular Filing Windows.

Petitioners suggest that the Commission revise its current practice of opening infrequent, irregular filing windows for ITFS modification applications to accommodate the sudden influx of applications that likely will be filed after the effective date of the new rules. Petitioners Comments, at 47-52. Infrequent filing windows result in a "gold rush" mentality in which applicants feel obligated to submit applications for fear that another filing window may be years away. Id., at 49-50. One commenter explained that "existing ITFS processing has proven to be much too sluggish and that the Commission will be slowed even further" by the complexity of advanced technologies applications.⁴²

CTN agrees that new processing rules should be adopted which provide applicants with more certainty and more opportunities to file ITFS applications.

⁴⁰ See, e.g., WONC Comments, at 6-8; ITFS Parties Comments, at 7; ITF Comments, at 4.

⁴¹ See Maryland Comments, at 4; Dallas Comments, at 9.

⁴² ITF Comments, at 4-5.

However, CTN believes that the rolling one-day filing window suggested by Petitioners is impractical and would wreak havoc among licensees and Commission staff. According to this proposal, an applicant would be required to protect all previously proposed facilities, even those submitted the preceding day. This requirement would create an enormous burden on ITFS applicants to monitor a steady stream of new applications filed with the Commission and to adjust interference studies up until the day of filing in order to account for any newly proposed facilities. If this approach were used, substantial litigation may result.⁴³

Instead of this burdensome approach, CTN recommends that the Commission establish the first five business days of every month as filing windows for ITFS and MDS applications related to establishment of two-way services in the market.⁴⁴ Like the proposed one-day window, the designation of monthly filing windows should reduce the flood of applications by providing applicants with regular opportunities to file. However, unlike the burdens imposed by a one-day filing window, the proposed monthly window will provide applicants with the ability to evaluate existing interference patterns and prepare applications without fear that these patterns will change before the application is filed. Accordingly, CTN suggests that the Commission adopt the modifications to Sections 21.27(d) and 74.911 set forth in its initial comments. See CTN Comments, at 32-33.

⁴³ See Multipoint Distribution Service Stations (Return of 4,330 Applications), 76 RR 2d 1254, 1312-13 (1994).

⁴⁴ CTN would support adoption of the monthly filing window for all new ITFS applications and major modifications.

B. The Commission Should Not Abandon Staff Review of Applications.

CTN agrees with those commenters who urge the Commission to reject Petitioners' automatic grant proposal.⁴⁵ While CTN supports expedited licensing procedures, it believes that such procedures can be adopted without abandoning the requirement for Staff review of applications and without removing the responsibility of the proposed station to ensure interference protection for incumbent operations prior to being licensed.

CTN submits that the dual grant procedure set forth in its initial Comments accomplishes these goals. If it is true, as Petitioners claim, that "wireless cable operators [will] be quite conservative in their system design" because of "the prospect of having to shut down new facilities. . . should incurable interference result,"⁴⁶ then there should be no practical difference between CTN's proposal and Petitioners' automatic grant system. Under each licensing scheme, the applicant could begin constructing and operating a proposed station if the 60-day public notice period closes without the filing of an opposition. Moreover, under each system, the new station would continue operating so long as there are no unresolved complaints of actual interference.⁴⁷

⁴⁵ MDS Alliance Comments, at 24; Dallas Comments, at 10; Maryland Comments, at 4.

⁴⁶ Petitioners Comments, at 34.

⁴⁷ Obviously, to receive a final license, the system must be operating with a substantial number of response station transmitters to test the incidence of interference. Subsequently installed response stations would be notified and tested through the procedure proposed to protect against brute force overload.

However, if actual interference should develop, CTN's proposed dual grant procedure would require the offending station to resolve the interference to the satisfaction of the Commission and the complainant before receiving final authorization.⁴⁸ In contrast, under Petitioners' automatic grant scheme, the burden would fall on the ITFS licensee whose receive site was suffering from interference to convince the offending station, who already would have its operating license, that its transmissions were the cause of the interference at the receive site. CTN submits that the burden for resolving harmful interference properly lies with the newcomer station, not the incumbent ITFS licensee. Accordingly, its proposal is consistent with established regulatory principles.

Recognizing the unusual nature of their automatic grant proposal,⁴⁹ Petitioners attempt to analogize their scheme for two-way services to the rules for other wireless services such as Local Multipoint Distribution Service (LMDS), Wireless Communications Service (WCS), General Wireless Communications Service (GWCS) and 39 GHz service. See Petitioners Comments, at 24, 26-28. Of course, these comparisons neglect one fundamental distinction: those frequencies are allocated in blocks to one service provider per geographic area. It is one thing to make a licensee responsible for resolving interference at the boundary of its

⁴⁸ To prevent interference from continuing indefinitely, the new provisional license should be conditioned on correcting interference within 10 days of receiving a complaint, or ceasing operations at that time.

⁴⁹ See Petitioners Comments, at 24 ("the proposed application processing rules are perhaps unusual for the Mass Media Bureau").

service area. It is quite another to give six or seven licensees of interleaved channels blanket authority to build systems that are supposed to ensure protection for each other within the same geographic area.⁵⁰

Petitioners note that the Commission recently has proposed rules for geographic area licensing even in encumbered services such as 800 MHz Specialized Mobile Radio (SMR) and Multiple Address Systems (MAS). Petitioners Comments, at 26-27. However, in each of these services, the Commission's geographic area licensing scheme includes explicit rules freezing incumbent systems in place. In the Commission's proposed rules for MAS, incumbents would be permitted to fill in dead spots in their coverage, but "would not be permitted to expand their systems without the consent of the geographic area licensee."⁵¹ The Commission noted that this approach is consistent with its rules for 800 MHz SMR. Regarding incumbent SMR operators, the Commission stated that "allowing non-EA licensees to expand their systems at will after wide-area licensing has occurred is not feasible."⁵² Freezing ITFS systems in place is unacceptable, and

⁵⁰ Petitioners acknowledge that ITFS licensees who participate in a two-way system "will all lose some degree of autonomy." Petitioners Comments, at 151. Even though an ITFS licensee can, in theory, file an "advanced technology" application, in practice, as the Commission recognizes, only the wireless cable operator will have the engineering resources and commercial ambition to drive complex engineering studies required under the Commission's proposed rules. See NPRM, ¶ 50.

⁵¹ Amendment of the Commission's Rules Regarding Multiple Address Systems (Notice of Proposed Rulemaking), 12 FCC Rcd 7973, 7984 (1997).

⁵² Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band (First Report and Order), 11 FCC Rcd 1463, 1513 (1995).

has not been proposed by either Petitioners or the Commission. Therefore, the application processing rules used for this model are irrelevant.

IV. CONCLUSION

CTN recommends adoption of new rules governing ITFS and MDS consistent with the proposals in its Comments and these Reply Comments.


Respectfully submitted,

CATHOLIC TELEVISION NETWORK

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February 9, 1998

Catholic Television Network

**Joint Engineering Exhibit
in Support of Comments to
MM Docket 97-217**

February 6, 1998

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Joint Engineering Statement of

John F.X. Browne, P.E., Robert W. Denny, Jr., P.E., and Dane E. Ericksen, P.E.

The firms of John F.X. Browne and Associates, P.C., Denny & Associates, P.C., and Hammett & Edison, Inc., have been jointly retained on behalf of the Catholic Television Network ("CTN"), representing numerous Instructional Television Fixed Service ("ITFS") stations licensed to, and operated by, the Roman Catholic Archdioceses and Dioceses throughout the United States, in support of CTN reply comments to MM Docket 97-217 concerning two-way, "cellularized" ITFS and Multipoint Distribution Service ("MDS") stations.

Petitioners' Analysis of BFO Interference Areas Is Technically Flawed

1. Beginning at page 74 of their comments, Petitioners discuss why CTN's concerns about BFO interference appear unwarranted. However, all of the Petitioners' calculations are based on the assumption that a Response Station would use a transmitting antenna at least meeting the performance characteristics of the FCC reference antenna. Yet, Petitioners' omission of such a proposed requirement in their proposed rules comments indicates a desire to not be so constrained. Therefore, all of the calculations are irrelevant, since apparently back-of-set omnidirectional "whip" antennas, or directional but customer-installed transmitting antennas, which would be subject to misorientation, are clearly possible under the Petitioners' scenario. For example, at page 124 of the comments, where Petitioners cite FCC text referring to a requirement for Local Message Delivery Service ("LMDS") operators to "provide user and installation information," and then provide, at the bottom of the page, an enthusiastic "me too" request for identical rules for customer-installed "advanced-technology" Response Stations.

2. So if customer-installed Response Stations are to be allowed, then all of Petitioners' suppositions about proper orientation of Response Station transmitting antenna orientations become invalid, because it would be imprudent to assume that a non-technically qualified customer would know the location of the nearest Response Hub. So long as service is obtained, a non-technical Response Station customer could easily have misaligned the Response Station transmitting antenna on a side lobe rather than the main lobe, and the antenna could be significantly misoriented.

Guardband Appropriateness

3. At page 101 of their comments, Petitioners quote an FCC policy that "guardbands are spectrally inefficient and, as a rule, are used only when coordination is impractical." First, the "spectrally inefficient" disadvantage cited in the FCC statement presumes that the guardband has



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no other usable purpose, but under the CTN proposal the guardbands can still be efficiently used for downstream commercial transmissions. But more importantly, the guardband-justifying case of "impractical coordination" is exactly the case here, since Petitioners want the freedom to install Response Stations wherever needed, without the requirement for a prior application. And that makes coordination impractical, and provides justification for the guardband approach proposed by CTN.

Protection of Response Station Hubs on a Power Density Basis Would Be Inappropriate and Unfair to Conventional Analog ITFS Stations

4. At Page 67 of their comments, Petitioners propose that in lieu of basing protection showings for Response Station Hubs on a D/U ratio basis, which requires establishing the "desired" signal level from a Response Station transmitter at an unknown future location, a power spectral density per Hertz of bandwidth instead be applied. The -190 dBW/m²/Hz co-channel criteria and -151 dBW/m²/Hz adjacent-channel criteria appear to be technically valid for uniform-density signals, but not for conventional NTSC analog signals. Petitioners acknowledge this, at page 68 of their comments, but their proposed solution, to treat analog signals as having a power spectral density over the 6 MHz analog channel bandwidth equivalent to the analog station's peak visual carrier power flux density, would wildly "stack the deck" in a Response Station Hub operator's favor. Under the Petitioners' scenario, conventional analog ITFS stations that elect not to convert to digital would be obligated to protect Response Station Hub receive sites when proposing modified ITFS NTSC facilities (and, to make matters even worse, Petitioners want authority to use omnidirectional receiving antennas for Response Station Hub receive sites). Thus, Petitioners want to base interference calculations for protection of existing NTSC analog receive sites on a more favorable spectral density basis, and, of course, be allowed to take full benefit of the directional receiving antenna characteristics required of ITFS receive sites, but expect analog ITFS licensees to provide interference protection to Hub Response Station receive sites based on the ITFS licensee's peak visual power and omnidirectional receiving antennas.

5. Of course, if a 'guardband' approach is adopted, then the above issues become moot, at least as far as ITFS licensees would be concerned, because there would no longer be the possibility of downstream ITFS and upstream Response Station co-channel or adjacent-channel operations.

Invalid Talkback Transmitter Analogy

6. At page 71, Footnote 112 of their comments, Petitioners attack the November 30, 1997, CTN filing by alleging an inconsistency regarding CTN's concern of brute force overload ("BFO")



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from Response Station transmitters, but not from ITFS Talkback transmitters. However, Petitioners' comparison of the BFO interference threat from Talkback transmitters to the BFO interference threat from Response Station transmitters is invalid because:

6a. ITFS talkback transmitters must be individually applied for and authorized, and their locations are therefore known in advance, whereas under the Petitioners' scenarios Response Station transmitters would not require individual applications or authorizations, and their locations would not be known in advance;

6b. ITFS talkback station transmitter powers are normally limited to no more than 250 mW, or +24 dBm, by Section 74.939(e) of the FCC Rules, or one-eighth of the transmitter power output ("TPO") Petitioners want for Response Station transmitters;

6c. The number of ITFS talkback transmitters would never exceed the number of authorized ITFS receive sites; most ITFS stations have fewer than 50 receive sites, and we are not aware of any ITFS station with more than 300 authorized receive sites. This is most likely at least an order of magnitude fewer potentially interfering sources than any likely to be constructed two-way wireless cable system would want to use.

7. So there is no inconsistency between CTN's concerns of BFO interference from a large number of high-powered Response Station transmitters but not from Talkback transmitters. Rather, this inconsistency is in Petitioners' position that there would be a serious interference threat to hypothetical PSA receive sites from 20-watt equivalent isotropic radiated power ("EIRP"), and mobile, Wireless Communication Services ("WCS") stations with the luxury of at least a 140 MHz guardband, but not from 2,000-Watt EIRP fixed Response Stations with no guardbands.

Petitioners' Claim of "Far Superior" Protection for ITFS Receive Sites is Incorrect

8. At page 91 of their comments, Petitioners claim that the BFO interference protection it now proposes for ITFS receive sites is "far superior protection than they are entitled to when subjected to BDC overload caused by WCS operations." This is incorrect. BFO overload protection from WCS is based on an interference threat from mobile stations with EIRPs not in excess of 20 watts and with at least a 140 MHz guardband. To try and equate that to BFO overload from fixed Response Stations with EIRPs of up to 63 watts (and possibility 2,000 watts, if Petitioners have their way) and with either no guardband, a 6-MHz guardband, or at most a 24-MHz guardband, is simply an invalid comparison.

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Petitioners' Proposal Regarding Spectrum Analyzer Measurements is a Good One and Should Be Adopted

9. At page 129 of their comments, Petitioners point out possible spectrum analyzer measurement errors when attempting to determine whether a Response Station signal would meet a particular radio frequency ("RF") mask specification. Petitioners correctly point out that specifying a single spectrum analyzer resolution bandwidth ("RBW") in the Rules would be a mistake, because a RBW appropriate for measuring a 6-MHz wide Response Station signal would be inappropriate for measuring a Response Station signal with a bandwidth, of, say, only 100 kHz. Petitioners' proposed solution, a rule instead requiring that for spectrum analyzer measurements the analyzer's RBW must be no greater than the bandwidth of the signal being measured, is a good solution and should be adopted.

Petitioners' Multipath and Signal Availability Calculations Purporting to Demonstrate a Need for 2,000-Watt EIRP Response Stations Communicating with 10 dBi Gain Response Hubs Also Demonstrate that 200-Watt EIRP Response Stations Communicating with 20 dBi Gain Response Hubs Would Also Work

10. Attachment 1 to Appendix A of the Petitioners' comments consists of calculations purporting to demonstrate that the proposed two-way, cellularized system will fail if Response Stations are limited to EIRPs of only 63 Watts (+18 dBW, or +48 dBm). We have no problem with the fundamental basis for these calculations, which apply standard calculation methodologies for signal availability based on multipath fading. However, the derivation is based on a Response Hub receiving antenna gain of 10 dBi. Calculations based on 2,000-watt EIRP Response Stations needing to communicate with Response Hubs with only 10 dBi gain receiving antennas also demonstrate, of course, that 200-watt EIRP Response Stations could communicate equally well with Response Hubs using 20 dBi gain receiving antennas. Petitioners' comments provide no documentation why a higher gain receiving antenna for Response Hubs could not be used, and, in fact, such higher gains would be readily achievable.

11. Finally, the Petitioners' insistence that the new proposed service will fail if 2,000-watt EIRP Response Stations are not allowed suggests that such high-powered stations would be the norm rather than the exception, further reinforcing the validity of CTN's BFO interference concerns.

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Commission Should Adopt the "Double Terrain-Sensitive" Interference Calculation Protocol Suggested by Petitioners

12. We agree with the point made by the Petitioners, at page 63 of their comments, that when a terrain-sensitive propagation model is used to more accurately predict desired and undesired signals levels at a particular location, especially for Protected Service Areas ("PSA") hypothetical receive site studies, there are situations where the desired signal is so weak that there is no reasonable expectation of service. Yet the FCC rules nevertheless still require a proponent to demonstrate the appropriate desired-to-undesired ("D/U") ratio (45 dB or better for co-channel, 0 dB or better for adjacent-channel). For example, if terrain-sensitive calculation methods show the desired signal to have a received carrier level ("RCL") of, say, -115 dBm, and the undesired signal level a RCL of say, -125 dBm, the D/U ratio is only 10 dB, yet the undesired signal is no interference threat to the desired signal because there would be no expectation of service at such a low RCL. A corollary approach would similarly apply in the case where the desired signal is still usable but the undesired signal is below thermal noise for the desired signal's bandwidth; for example, if the desired signal RCL is, say, -70 dBm and the undesired signal is -111 dBm, the D/U ratio is only 41 dB, but the -111 dBm RCL of the interferer could not possibly cause interference because it would be 3 dB below even thermal noise for a 6-MHz bandwidth signal at room temperature (typically taken to be -59 dBmV, or -108 dBm).

13. This technically-valid approach was, unfortunately, disallowed in the Memorandum and Order on Reconsideration to MM Docket 94-131, where, at paragraph 31, the Commission declined to allow "cutoff" thresholds, below which an undesired signal would not be considered to be an interference threat, regardless of the D/U ratio, or below which a desired signal would be of such poor quality that no paying customer would ever tolerate such service. For conventional National Television System Committee ("NTSC") analog signals, we believe conservative RCL cutoff thresholds would be -76 dBm (*i.e.*, -27.2 dBmV) for desired signals* and -108 dBm (*i.e.*, -59.1 dBmV) for undesired signals.

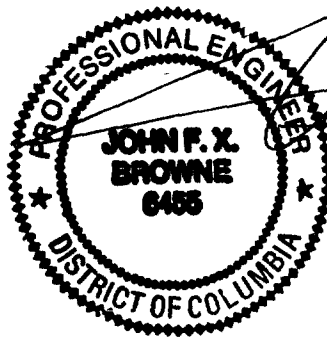
14. Recognizing that Response Station transmissions may well use bandwidths of other than 6 MHz, the Petitioners comments go on to introduce the concept of bandwidth-adjusted cutoff thresholds. We support this approach, and suggest that to the above offered desired and

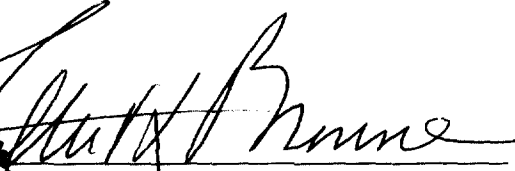
* The -76 dBm useful signal RCL was derived from the former 36 dB carrier-to-noise ("C/N") ratio previously allowed by the FCC's cable television technical standards (the current FCC cable television technical standards now require a minimum C/N of 43 dB). To this ratio was added an assumed downconverter noise figure of 2 dB, for a total of 38 dB. For 6 MHz wide NTSC TV signals, thermal noise at room temperature is approximately -108 dBm. To provide a 36 dB C/N would therefore require a RCL of at least -70 dBm. To this figure was added a 6 dB safety factor, to yield a conservative useful signal threshold of -76 dBm.

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Summary

15. BFO interference is a valid concern and the mitigation measures proposed by CTN to ensure it does not become an unmanageable problem must be adopted. a guardband of at least 6 MHz is imperative, so as to place the interference risk where it rightfully belongs, in the spectrum being used by the newcomer service, and to avoid completely, at least as far as ITFS licenses would be concerned, the need to adopting the unworkably-complex interference calculating algorithm proposed by WCA, which even it admits would be a "kluge."**




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** WCA comments, at page 16, first line

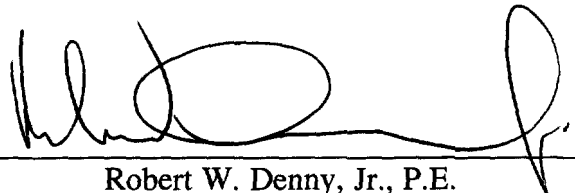
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undesired RCL cutoff thresholds a bandwidth factor of $10\log_{10}(\text{actual signal bandwidth}/6 \text{ MHz})$ be allowed. For example, for a Response Station transmitter using a bandwidth of only 100 kHz its protection cutoff thresholds would be adjusted by -17.8 dB [$10\log_{10}(0.1 \text{ MHz}/6 \text{ MHz})$].

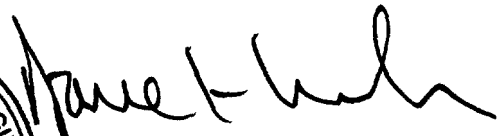
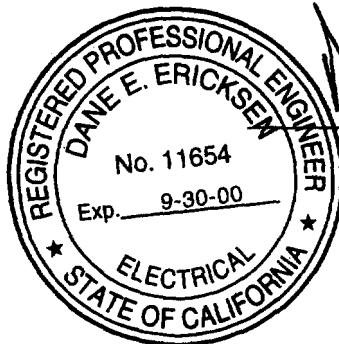
Summary

15. BFO interference is a valid concern and the mitigation measures proposed by CTN to ensure that it does not become an unmanageable problem must be adopted. A guardband of at least 6 MHz is imperative, so as to place the interference risk where it rightfully belongs, in the spectrum being used by the newcomer service, and to avoid completely, at least as far as ITFS licensees would be concerned, the need to adopt the unworkably-complex interference calculating algorithm proposed by Petitioners, which even Petitioners admit would be a "kluge."**

John F.X. Browne, P.E.
John F.X. Browne and Associates, P.C.
Consulting Engineers



Robert W. Denny, Jr., P.E.
Denny & Associates, P.C.
Consulting Engineers



Dane E. Ericksen, P.E.
Hammett & Edison, Inc.
Consulting Engineers

February 6, 1998

** Petitioners' comments, at page 16, first line.

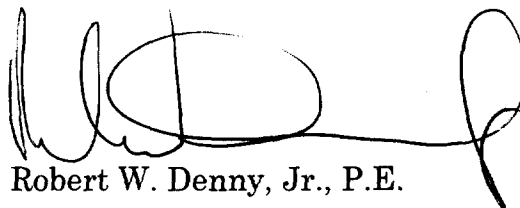
DENNY & ASSOCIATES, P.C.
CONSULTING ENGINEERS
WASHINGTON, DC

JOINT ENGINEERING EXHIBIT
IN SUPPORT OF REPLY COMMENTS IN
MASS MEDIA DOCKET NUMBER 97-217
CATHOLIC TELEVISION NETWORK


Affidavit

WASHINGTON)
)
DISTRICT OF COLUMBIA) ss:

Robert W. Denny, Jr., being first duly sworn, says that he is president and treasurer of the firm of Denny & Associates, P.C., consulting engineers with offices in Washington, DC; that he is a professional engineer registered in the District of Columbia, the State of Maryland, and other jurisdictions; that his qualifications as an expert in radio engineering are a matter of record with the Federal Communications Commission; that the foregoing exhibit was prepared by him or under his direction; and that the statements contained therein are true of his own personal knowledge except those stated to be on information and belief and, as to those statements, he verily believes them to be true and correct.


Robert W. Denny, Jr., P.E.

Subscribed and sworn to before me this 6th day of February, 1998.


Jennifer J. Mateik
Notary Public, District of Columbia
My commission expires June 30, 2001

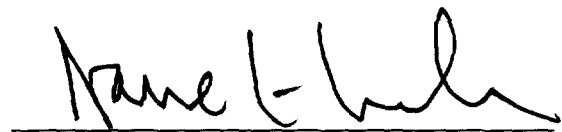
Affidavit

State of California
County of Sonoma

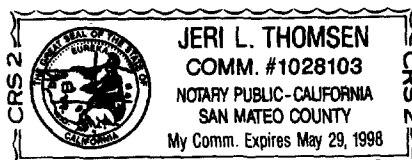
ss:

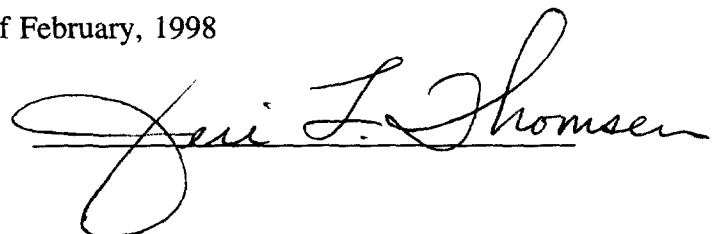
Dane E. Ericksen, being first duly sworn upon oath, deposes and says:

1. That he is a qualified Registered Professional Engineer, holds California Registration No. E-11654, which expires on September 30, 2000, and is employed by the firm of Hammett & Edison, Inc., Consulting Engineers, with offices located near the city of San Francisco, California,
2. That he graduated from California State University, Chico, in 1970, with a Bachelor of Science Degree in Electrical Engineering, was an employee of the Field Operations Bureau of the Federal Communications Commission from 1970 to 1982, with specialization in the areas of FM and television broadcast stations and cable television systems, and has been associated with the firm of Hammett & Edison, Inc., since October 1982,
3. That the firm of Hammett & Edison, Inc., Consulting Engineers, have been jointly retained on behalf of the Catholic Television Network ("CTN"), representing numerous Instructional Television Fixed Service ("ITFS") stations licensed to, and operated by, the Roman Catholic Archdioceses and Dioceses throughout the United States, in support of CTN reply comments to MM Docket 97-217 concerning two-way, "cellularized" ITFS and Multipoint Distribution Service ("MDS") stations,
4. That such engineering work has been carried out by him or under his direction and that the results thereof are attached hereto and form a part of this affidavit, and
5. That the foregoing statement and the report regarding the aforementioned engineering work are true and correct of his own knowledge except such statements made therein on information and belief and, as to such statements, he believes them to be true.


Dane E. Ericksen, P.E.

Subscribed and sworn to before me this 6th day of February, 1998







HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

980206
Affidavit

CERTIFICATE OF SERVICE

I, Bradley S. Albert, hereby certify that I have on this 9th day of February 1998, caused copies of the foregoing Reply Comments to be delivered via hand delivery (indicated with *) or by U.S. certified mail, postage prepaid, return receipt requested, to the following:

The Honorable William Kennard *
Federal Communications Commission
1919 M Street, N.W.
Room 814
Washington, D.C. 20554

The Honorable Susan Ness *
Federal Communications Commission
1919 M Street, N.W.
Room 832
Washington, D.C. 20554

The Honorable Gloria Tristani *
Federal Communications Commission
1919 M Street, N.W.
Room 826
Washington, D.C. 20554

Charles Dziedzic *
Mass Media Bureau
Federal Communications Commission
1919 M Street, N.W., Suite 702
Washington, D.C. 20554

Christopher Wright *
General Counsel
Federal Communications Commission
1919 M Street, N.W., Room 614
Washington, D.C. 20554

The Honorable Harold Furchtgott-Roth *
Federal Communications Commission
1919 M Street, N.W.
Room 802
Washington, D.C. 20554

The Honorable Michael Powell *
Federal Communications Commission
1919 M Street, N.W.
Room 844
Washington, D.C. 20554

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1735 New York Avenue, N.W.
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Washington, D.C. 20006-5289